

Overview

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Power electronics technology controls electricity by the on-off action of power semiconductor devices to realize rotation operation of motors and electric power transmission. The technology is used in personal goods such as automobiles and home appliances, systems that support social infrastructure such as railways and power transmission and distribution systems, and electrical equipment at many factories and offices. The technology makes it possible to supply electricity in a highly efficient and stable way, thus making life more comfortable.

Mitsubishi Electric Corporation has been manufacturing and selling power electronics products and developing technologies for them. Regarding power semiconductor devices, silicon carbide and other wide band gap semiconductor devices started spreading and were first applied to air conditioners for which energy saving was needed. Regarding power converters for power transmission and distribution, modular multilevel converters suitable for high voltage were applied to STATCOM for electric power. Regarding control technologies of power electronics, there has been remarkable progress in the position sensorless control of permanent magnet synchronous motors. Technologies for extending the service life of storage batteries and for monitoring their statuses are under development for differentiation in energy management. In addition, many researchers have been working on integration technologies that optimize the layout of each H/W for downsizing. This paper introduces the latest trend of technologies that support power electronics products and the latest power electronics systems.